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Repudiation, retaliation and the secondary market price of sovereign debts

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ABSTRACT

This paper is concerned with the relationship between the secondary-market price of sovereign debts and the possibility of repudiation and retaliation. Using the distinction between 'good' and 'bad' states of world, the indebted countries optimal repudiation rate as well as the creditor's optimal retaliation and reservation price for any repudiation rate are analyzed under the assumption that the debtor and creditor are risk averse and expected-utility maximizers. Matching both debtor and creditor's considerations, the chapter analyzes the Cournot-Nash equilibrium repudiation and retaliation rates and the secondary market price of a sovereign debt.

Note: This paper was presented in the 13th Economic Theory Workshop, hosted by the Australian National University in February 1995.

1 Introduction

A country's external debt is a sovereign debt. Hence, a rise in a country's level of indebtedness increases its incentive to repudiate (Kenen, 1990). The secondary market for sovereign debts has been a mechanism for alleviating countries' external-debt burden and increasing the expected debt repayments. In this market, an indebted country expects to buy back its debt at a discount, reflecting the creditors' belief that the country will not meet its external obligations fully. In this respect, Berg and Sachs (1988), who fitted a tobit model to developing countries' debt discounts, have concluded that higher income inequality leads to a greater discount, while higher outward orientation, agricultural share, and GNP per capita squared tend to decrease the secondary market discount. Other market-based debt-reduction schemes have been discussed by Krugman (1989) and non-market-based debt-relief arrangements by Sachs (1989).

The simplest conceptual approach for explaining the secondary prices of sovereign debts is based on the notion of the *Debt-Laffer Curve* (Krugman,1988) and the distinction between 'good' and 'bad' states of world implying that the sovereign debt repayment has the following binomial distribution:

$$DR = \begin{cases} D & 1-p \\ (1-r)D & p \end{cases} \tag{1}$$

where,

D = the book value of the sovereign debt,

p = the probability of a 'bad' state of world, and

r = the rate of repudiation.

Consequently, that approach suggests that the price of a sovereign external debt (P) in the secondary market can be approximated by the ratio of the expected debt repayment to the book value of the debt:

$$P = \frac{E(DR)}{D} = 1 - rp . \qquad (2)$$

That is, the discount on a dollar of debt is equal to the repudiation rate times the probability of a 'bad' state of world in which the country's revenues are too small for servicing its external liabilities.

The drawbacks of the approach described above are that it does not provide an explanation for the rate of repudiation and does not take into account creditors' retaliation as well as risk aversion of both the indebted sovereign and creditor. The purpose of this chapter is to provide a conceptual analysis of the relationship between the secondary-market price of sovereign debt and the possibility of repudiation and retaliation under the assumption that both creditor and debtor are risk averse, maximize expected utility and take each other's reaction into account. The analysis assumes that the creditor's retaliation is limited to seizing the debtor's assets abroad and restrained from escalation to a trade warfare. It also assumes that the indebted country is relatively small and facing competitive foreign lenders so that the creditor and debtor should not be viewed as being engaged in an implicit reputation contract. As has been argued by Bulow and Rogoff (1989):

> [a] good reputation for repaying foreign loans does not enhance a small country's ability to borrow abroad. As long as the country faces competitive foreign investors, then any service provided by the current lender can equally well be provided by a new investor. (p. 47)

Using the distinction between 'good' and 'bad' states of world, the creditor's optimal retaliation and reservation price for any repudiation rate as well as the indebted country's optimal repudiation rate for any level of retaliation are analyzed in the following sections. The Cournot-Nash equilibrium repudiation and retaliation rates and the secondary market price of sovereign debts are found subsequently by matching both debtor's and creditor's considerations under the assumption of symmetric information about the state of the world.

2 The creditor's optimal seizure rate for a given repudiation rate

The formulation of the creditor's behaviour is based on the belief that in a 'good' state of world the indebted country enjoys relatively high revenues and is able to repay its liabilities; whereas in a 'bad' state of world the indebted country's revenues are moderate and consequently it repudiates part or all of its external debts. Using this distinction between 'good' and 'bad' states of world, the returns for the creditor, y, are perceived to have the following distribution:

$$y = \begin{cases} D & 1 - p \\ (1 - r)D + sA & p \end{cases} \tag{3}$$

where,

A = the indebted country's assets abroad (e.g., public assets on which the sovereign has a direct control, such as embassies and consulates, and private assets on which the sovereign has only an indirect control);

r = the indebted country's repudiation rate; and

s = the share of the debtor's assets holding abroad seized by the creditor.

Given that the creditor's subjective distribution of returns is as displayed by equation 3, the mean and variance of y are perceived by the creditor to be:

$$E(y) = (1 - rp) D + psA \tag{4}$$

and

$$\begin{aligned} var(y) &= (1 - p)D^2 + p[(1 - r) D + sA]^2 - [(1 - rp)D + psA]^2 \\ &= p (1 - p) [r^2 D^2 - 2rsAD + s^2A^2]. \end{aligned} \tag{5}$$

It is postulated that the creditor's preferences over the random returns can be represented by the mean-variance expected utility function:

$$E[u (y)] = E(y) - 0.5R_c var (y) \tag{6}$$

where R_c denotes the creditor's degree of absolute risk aversion.

(See Hlawitschka, AER 1994, for a recent discussion of the generality and suitability of this framework.)

The substitution of equations 4 and 5 into equation 6 implies that the creditor's expected utility from the debt-repayment and seizure of the sovereign's assets can be rendered as:

$$E[u(y)] = (1 - rp)D + psA - 0.5R_c\, p\,(1 - p)\,[r^2D^2 - 2rsAD + s^2A^2]. \qquad (7)$$

Note that by delaying the decision about the retaliation level on future repudiation until realization of the state of the world, the creditor is running a risk of losing a collateral once a 'bad' state of world is realized, as such a delay might give the indebted country and its citizens an opportunity to liquidize and repatriate their assets abroad. Therefore, it is optimal for the creditor to chose the seizure rate in advance so as to maximize the above expected utility. This choice is made subject to the collateral constraint that $s \leq 1$.

The Kuhn-Tucker conditions for maximum constrained-expected utility from debt repayment and seizure of the indebted country's foreign assets are

$$pA + R_c\, p(1 - p)\,(rAD - sA^2) - \Gamma \leq 0 \qquad (8a)$$

$$s[pA + R_c\, p(1 - p)\,(rAD - sA^2) - \Gamma] = 0 \qquad (8b)$$

$$s \leq 1 \qquad (8c)$$

$$\Gamma \geq 0 \qquad (8d)$$

where Γ is the Lagrange multiplier representing the shadow value of the collateral constraint.

These conditions imply that the optimal seizure rate is given by

$$s^* = \begin{cases} [(1 - p)R_cA]^{-1} + (D/A)r & \text{if } \Gamma = 0 \quad (9a) \\ 1 & \text{if } \Gamma > 0 \quad (9b) \end{cases}$$

When the collateral constraint is not binding (i.e., A is relatively large in comparison to D and hence Γ=0), the creditor's best policy is to adopt a 'tit for tat' rule by which the seizure rate is smaller than unity and linearly increases with the debtor's repudiation rate proportionally to the debtor's effective leverage (D/A). In this case, the optimal seizure rate also rises with the creditor's subjective probability of default, and declines with the creditor's degree of absolute risk aversion. It is also important to note that the Khun-Tucker conditions imply that even in a 'good' state of world, in which the indebted country is expected to repay its debt fully (i.e., r=0), it is still optimal for the creditor to exercise a positive seizure rate in order to compensate for the risk-bearing costs stemming from uncertainty about the state of world:

$$s^* = \frac{1}{(1 - p)R_cA} \cdot \qquad (10)$$

Obviously, when the collateral constraint is binding, the creditor's best policy is a complete seizure of the indebted country's assets abroad.

3 Creditor's secondary market reservation price for a given repudiation rate

The creditor's reservation price (P_c) of recycling the indebted country's debt can now be found by substituting the optimal seizure rate into equation 7 and dividing the resultant expected utility by the debt level.

When the collateral constraint (i.e., A>D), the creditor's reservation price of recycling the indebted country's debt is

$$P_c = 1 + \left[(1 - \frac{D}{A^2})r + \frac{0.5}{(1\text{-}p)R_c D} \right] p. \qquad (11)$$

Here, the creditor enjoys a retaliatory edge over the indebted country and hence his reservation price is greater than one and rises with the debtor's asset holding abroad, the perceived probability of default and the repudiation rate. However, the creditor's reservation price of the sovereign bonds is lowered by the creditor's degree of risk aversion and the sovereign's debt level.

It is more likely that the indebted country's foreign assets are significantly smaller than its external liabilities. In which case, the collateral constraint is binding and the creditor's reservation price is found by substituting a unit seizure rate in the creditor's expected utility and dividing the resultant by D:

$$P_c = 1 - \{r + 0.5R_c\,(1 - p)\,[r^2 - 2rA/D + (A/D)^2]D - A/D\}p \qquad (12)$$

where A/D can be interpreted as the inverse of the indebted country's effective leverage. Note that in this case,

$$\frac{\partial P_c}{\partial \frac{A}{D}} = \{1 - 0.5R_c(1\text{-}p)\left[\frac{A}{D} - r\right]\}p. \quad (13)$$

Consequently, as long as A/D is larger than the repudiation rate perceived by the creditor, an increase in the effective leverage raises the creditor's reservation price of the sovereign external bonds proportionally to his degree of risk aversion and perception of the probability of default. Furthermore, in this case P_c declines with the perceived repudiation rate (r) as long as

$$r - A/D < 1/R_c\,(1 - p). \quad (14)$$

That is, the likelihood that a rise in the perceived repudiation rate reduces the creditor's reservation price declines with the indebted country's effective leverage and the creditor's assessment of the probability of 'bad' state of world, but increases with the creditor's degree of absolute risk aversion.

4 The indebted country's optimal repudiation rate

The indebted country's decision problem is postulated as setting the repudiation rate as to maximize expected utility from the returns on domestic assets and asset holding abroad, taking into account, on the one hand, that loan repayments reduce the consumption and investment budget; but on the other hand, that in the case of a default, the creditor retaliates by seizing part or all of the asset holding abroad. The indebted country's decision problem is postulated as setting The analysis of the indebted country's behaviour is also based on the distinction between 'good' and 'bad' states of world. In a 'good' state of world the indebted country enjoys relatively high revenues and can repay its liabilities; whereas in a 'bad' state of world the indebted country's revenues are moderate and consequently it cannot repay its external debt fully. It is assumed that the creditor provides signals about the potential retaliation for any level of repudiation. These signals enable the indebted country to assess accurately the seizure rate function $0 \leq s(r) \leq 1$. It is also assumed that the rates of return on domestic assets and asset holding abroad are identical.

In this setting the distribution of the indebted country's consumption and investment budget, x, is given by

$$x = \begin{cases} (K + A)v - D & 1 - p \\ [K + (1 - s(r))A]\delta v - (1 - r)D & p \end{cases} \qquad (15)$$

where,

K = the indebted country's domestic assets;

v = the rate of return on assets under a 'good' state of world; and

δ = the ratio of the indebted country's revenues under a 'bad' state of world to those attainable under a 'good' state of world ($0 < \delta < 1$).

The distribution of x implies that the mean and variance of the indebted country's consumption and investment budget are

$$E(X) = [(K + A)v - D]\,(1 - p) + \{[K + (1 - s(r))\,A]\,\delta v - (1 - r)\,D\}p \qquad (16)$$

and

$$\mathrm{var}(x) = E(x^2) - (E(x))^2$$

$$= (1 - p)\,[(K + A)v - D]^2 + p\{[K + (1 - s(r))\,A]\,\delta v - (1 - r)\,D\}^2$$

$$+ \{[K + A)v - D]\,(1 - p) + \{(K + (1 - s(r))\,A)\,\delta v - (1 - r)D]p\}^2. \quad (17)$$

Suppose that the indebted country's preferences on consumption and investment can be represented by the following mean-variance expected utility function:

$$E[u\,(X)\,] = E(X) - 0.5R_d\,\mathrm{var}(X) \quad (18)$$

where R_d is the indebted sovereign's degree of absolute risk aversion. Then, by substituting equations 16 and 17 into equation 18, the indebted country's decision problem can be rendered as

$$\text{Maximizing } \{[(K + A)\,v - D]\,(1 - p) + \{[K + (1 - s(r))\,A]\,\delta v - (1 - r)\,D\}p$$

$$-0.5R_d\,\{(1 - p)\,[(K + A)\,v - D]^2 + p\{[K + (1 - s(r))A]\,\delta v - (1 - r)\,D\}^2$$

$$+ \{[(K + A)\,v - D](1 - p) + \{(K + (1 - s(r))\,A)\,\delta v - (1 - r)\,D]p\}^2\}.$$

with respect to r and subject to the repudiation constraint

$$r \leq 1. \quad (19)$$

The Khun-Tucker conditions for maximum expected utility from consumption and investment are:

$$p[D - s'(r)\,\delta vA]\{1 - R_d\,[(K + (1 - s(r))A)\delta v - (1 - r)D]\,(1 + p)$$

$$- R_d\,[(K + A)v - D](1 - p)\} - \mu \leq 0 \quad (20a)$$

$$r\{p\,[D - s'(r)\,\delta vA]\{1 - R_d\,[(K + (1 - s(r))A)\delta v - (1 - r)D]\,(1 + p)$$

$$- R_d\,[(K + A)\,v - D]\,(1 - p)\} - \mu\} = 0 \quad (20b)$$

$$r \leq 1 \quad (20c)$$

$$\mu \geq 0 \quad (20d)$$

where μ is the Lagrange multiplier representing the shadow price of the repudiation constraint.

Suppose now that the indebted country's asset holding abroad is sizeable and/or the returns on these assets are sufficiently large, and the penalty for repudiation is perceived to increase substantially with the repudiation rate so that the indebted country refrains from practising a complete repudiation and repays a part of its loans (i.e., μ=0 and hence r<1). Under this assumption, the optimal repudiation rate from the indebted country's perspectives should obey the following equality:

$$1 - R_d \{[(K + (1 - s(r))A)\delta v - (1 - r)D](1 + p) - [(K + A)v - D](1 - p)\} = 0. \quad (21)$$

That is, a change in the costs of risk bearing stemming from an infinitesimal increase in the repudiation rate should be offset by the change in the expected consumption and investment.

5 Equilibrium rate of repudiation and the secondary market price

When the collateral constraint is binding and the probability of a 'bad' state of world is perceived by the creditor to be high, the creditor exercises a complete seizure of the indebted country's asset holding abroad before these assets would be liquidated by the indebted sovereign. In turn, it is optimal for the indebted country to repudiate fully its external debt, and consequently, by virtue of equation 12, the value of the sovereign external bonds in the secondary-market is smaller than one as indicated by the following expression:

$$P^* = 1 - \{1 + 0.5R_c (1 - p) [1 - 2A/D + (A/D)^2]D - A/D\}p. \quad (22)$$

Note that since in this case $A/D<1$, an increase in A/D would raise the price of the sovereign external bonds in the secondary market. This effect is amplified by the creditor's degree of absolute risk aversion.

In contrast, in the less likely case where the indebted country's asset-holding abroad is sufficiently large so that the collateral constraint is not binding, the Cournot-Nash equilibrium secondary-market price of the sovereign external bonds is greater than one. Under the assumption that the indebted sovereign and the creditor have identical assessment of the distribution of the state of the world (i.e., p) and that they fully know each other's considerations, this equilibrium price can be found as follows. First, the substitution of the optimal seizure rate indicated by equation 9a into the debtor's optimality condition 21 implies that in equilibrium the debtor's optimal repudiation rate is:

$$r^* = \frac{[(1-p) - (1+p)\delta]v(K+A) + 2pD + \dfrac{(1+p)\,\delta v}{(1-p)R_c} + \dfrac{1}{R_d}}{(1-dv)(1+p)D} \quad (23)$$

Subsequently, the substitution of r* into equation 11 gives the equilibrium price of the sovereign external bonds in the secondary market:

$$P^* = 1 + \frac{0.5p}{(1-p)R_cD} + (1 - \frac{D}{A^2})pr^* \qquad (24)$$

Equations 23 and 24 indicate that the effect of the probability of a 'bad' state of world on both the equilibrium repudiation rate and secondary-market price is not clear and straightforward as suggested by equation 2. These equations lead to the following propositions:

i. If $\delta < \frac{1-p}{1+p}$ (i.e., the ratio of rate of return on assets in a 'bad' state of world to that in a 'good' state of world is sufficiently small), the larger the sovereign domestic assets and asset-holding abroad the higher the equilibrium rate of repudiation and the secondary market price.

ii. If $\delta < \frac{1-p}{1+p}$, the higher the rate of return on the sovereign assets in a 'good' state of world the higher the equilibrium rate of repudiation and the secondary market price.

iii. The higher the creditor's and debtor's degree of absolute risk aversion the lower the equilibrium repudiation rate and secondary-market price of the sovereign external bonds.

References

Berg, A. and Sachs, J. (1988), 'The Debt Crisis: Structural Explanation of Country Performance', *Journal of Development Economics,* vol. 29, pp. 271–306.

Bulow, J. and Rogoff, K. (1989), 'Sovereign Debt: Is to Forgive to Forget?', *American Economic Review,* vol. 79, no. 1, pp. 43–50.

Hlawitschka, W. (1994), 'The Empirical Nature of Taylor-Series Approximations to Expected Utility', *American Economic Review,* vol. 84 (June), pp. 713–9.

Kenen, P.B. (1990), 'Organizing Debt Relief: The Need for a New Institution', *Journal of Economic Perspectives,* vol. 4, pp. 7–18.

Krugman, P.R. (1988), 'Financing vs. Forgiving a Debt Overhang', *Journal of Development Economics,* vol. 29, pp. 253–68.

—— (1989), 'Market-Based Debt-Reduction Schemes,' in Frenkel, J.A., Dooley, M.P. and Wickham, P. (eds.), *Analytical Issues in Debt,* International Monetary Fund, Washington DC.

Sachs, J. (1989), 'Conditionality, Debt Relief, and the Developing Country Debt Crisis', in Sachs, J. (ed.), *Developing Country Debt and Economic Performance,* University of Chicago Press, Chicago.

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